

SIMULATION NEEDS OF THE PHOTO-Z WG

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TWO TYPES OF PHOTO-Z ESTIMATION

- Direct photo-z estimation
- Cross-correlations

WHAT PHOTO-Z ESTIMATION REALLY IS

- **Direct photo-z** estimation is really a problem of **galaxy classification**.
- **Cross-correlation** photo-zs is really a problem of **galaxy clustering and halo occupation**.

USES OF SIMULATIONS – SHORT TERM

- Improve algorithms
- Check that we more or less know how to deal with some of the main uncertainties

USES OF SIMULATIONS – LONG TERM

- Sims become THE measure of our understanding of observations.
- Direct calibration:
 - Want to be able to **reproduce statistical spectro-photometric** properties of existing surveys, and eventually of LSST.
 - If we can't do that, it means we don't understand how to classify galaxies correctly, which means we don't understand photo-zs.
 - At the very least, need to know how to parametrize uncertainties.
- Cross-correlations:
 - Reproduce clustering properties of observed samples as a function of redshift, color, ...
 - Including large quantity of astrophysical and observational systematics

DIRECT PHOTO-ZS: PRIORITIES

- Accurate color statistics
 - Accurate $p(z, \text{Type}, M)$ distributions
 - Accurate SEDs (including AGN contribution, emission lines, ...)
 - Realistic galaxy morphologies – because flux measurement and blending depend on it.
 - (de)Blending, stellar contamination
- Angular systematics
 - Angular variations in observing conditions

CROSS-CORRELATION: PRIORITIES

- Relating galaxies to dark matter halos: realistic biasing schemes
- Lensing Magnification
- Angular systematics:
 - Blends
 - Star-galaxy separation
 - Variation in survey depth, extinction, calibration

DIFFERENT SIMS FOR DIFFERENT NEEDS

- A lot of testing only requires a small piece of the simulations.
- E.g. – direct photo-z estimation often doesn't need more than say a subsample of ~1 million galaxies or even less. A fast, small, photometry-only simulation could allow one to find the galaxy type/luminosity function description of existing data sets.
- In such cases, should our WG develop its own simulation tools? (that's what's happening at the moment).
- Its often desirable to be able to turn systematics on and off.
- For cross-correlations, we could do a lot with a few 100's of square degrees.

WHAT CAN PHOTO-ZS DO FOR SIMULATIONS

- Example 1: Improvement in photo-zs equates to an improvement in our understanding of galaxy populations. How can we transmit that knowledge to the simulations working group?
- Example 2: We have many simulation tools in hand. Does SIMS WG want any of them?
- We could continue as we are, developing our own tools, but that is certainly not the most efficient way.